

REMARKS

Applicants thank the Examiner for the thorough consideration given the present application. Claim 1-14, 16 and 18 are currently being prosecuted. The Examiner is respectfully requested to reconsider his rejection in view of the amendments and remarks as set forth below.

Rejection under 35 U.S.C. 102

Claims 1, 4, 5, 8, 11-14, 16, 20 and 21 stand rejected under 35 U.S.C. 102 as being anticipated by Takahashi (USP 6,297,792). This rejection is respectfully traversed.

First, claims 20 and 21 have been cancelled rendering this part of the rejection moot.

In response to the arguments in the previous Amendment, the Examiner stated that Takahashi teaches applying a first signal to the liquid crystal pixel cells through the data lines for charging during the beginning of a frame and applying a second signal different from the first signal to the liquid crystal pixel cells through the data lines for discharging during an ending of the frame. However, Applicants submit that the Takahashi reference fails to suggest all of the features of the claimed invention.

First, the present invention has a first signal and a second signal which are sequentially applied to the data lines in a frame.

In particular, the first signal (pixel on data) is applied to the data lines in synchronization with a first gate pulse applied to a gate line, for example, during a first half of one frame (one vertical period), and the second signal (pixel off data) is applied to the data lines in synchronization with a second gate pulse applied to the gate line, for example, during a second half of one frame.

This can be compared with the arrangement in Takahashi, which discloses that a charging mode, in which a first selecting voltage is applied, is set as a predetermined period in a first horizontal period, an overcharging period, in which a precharge voltage is applied, is set as the first half of a second horizontal period after one vertical period, and a discharging mode, in which a second selecting voltage is applied, is set as the second half of the second horizontal period.

Thus, Takahashi discloses applying a first selecting voltage in a predetermined period of the first horizontal period in one frame and applying a second selecting voltage in the second half of the first horizontal period in next frame. In Takahashi, the second horizontal period is to indicate the first horizontal period of the next frame.

Furthermore, Takahashi discloses applying data signal in the predetermined period of the first horizontal period and applying

data signal in the first half and the second half of the second horizontal period (that is, the first horizontal period of the next frame).

In the present invention, the first signal (pixel on data) is applied during the beginning of a frame, for example, the first half of the frame, and the second signal (pixel off data) is applied during the ending of the frame, for example, the second half of the frame.

Takahashi fails to teach or suggest the application of the first signal during the beginning of a frame and the application of the second signal during the ending of the frame. In view of this, Applicants submit that claim 1 is not anticipated by obvious over the Takahashi reference.

Claim 5 is an apparatus claim, which is similar to claim 1 in that it recites the two signals and the time of their application. Accordingly, Applicants submit that claim 5 is likewise allowable for similar reason.

Claim 11 describes a similar limitation to claim 1, but in different terms. Claim 11 describes that the cell is charged during a beginning portion of the frame and discharged before an end of the frame. Thus, the claim also describes the timing of the signals, but in terms of the charging and discharging of the cell. Accordingly, claim 11 is allowable for the same reason.

Claims 13 and 14 are both independent claims and include the limitations of applying charges during different parts of the frame. Since these limitations also apply to the timing of the application of the signals, these claims are also not obvious over Takahashi. Accordingly, these claims are allowable for the same reasons recited above.

Claims 2-4 depend from allowable claim 1, claims 6-8 depend from allowable claim 5, claim 12 depends from allowable claim 11 and claim 16 depends from allowable claim 14. In view of their dependency, these claims are considered to be additionally allowable.

Rejection under 35 U.S.C. 103

Claims 2, 3, 6 and 7 stand rejected under 35 U.S.C. 103 as being obvious over Takahashi in view of Miwa et al. (USP 6,369,469). This rejection respectfully traversed.

The Examiner cites the Miwa reference to show two signals applied in one frame period. However, even if this reference does teach this feature, these claims are still allowable based on dependency from allowable independent claims.

Claim 18 stands rejected under 35 U.S.C. 103 as being obvious over Takahashi in view of Kubota et al. (USP 5,907,313). This rejection is respectfully traversed.

The Examiner cited the Kubota reference to teach that a liquid crystal display device can include a plurality of gate drivers connected in series. The Examiner feels it would have been obvious to one of ordinary skill in the art to include the plurality of gate drivers shown in Kubota in the Takahashi device. Applicants disagree that this combination would be obvious.

The Examiner has pointed out no motivation why one skilled in the art would make such a combination. Furthermore, Applicants submit that it would not be simple to merely replace the existing gate driver with Takahashi with the one shown in Kubota. That is, there could be considerable differences in timing and signal levels and other arrangements that must be worked out in order for the two systems to be combined. Since there is no motivation taught in either reference for such a combination, there would no reason for one skilled in the art to overcome these difficulties of combining the two devices without some reason for doing so. The Examiner suggests that this would increase the speed of the display. However, it is not at all clear that this speed would increase since the original device it designed to operate under certain conditions. Merely changing the gate driver arrangement may not cause such an increase. The Examiner is requested to provide some indication as to why he feels that the speed of the display would be increased with such a combination. The Examiner is also

requested to point out what motivation is present to cause one skilled in the art to make such a combination. Accordingly, Applicants submit that such a combination would not be obvious to one of ordinary skill in the art and that accordingly claim 18 defines thereover.

Conclusion

In view of the above remarks, it is believed that the claims clearly distinguish over patents relied on by the Examiner, either alone or in combination. In view of this, reconsideration of the rejections and allowance of all the claims is respectfully requested.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Robert F. Gnuse (Reg. No. 27,295) at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

Appl. No. 09/725,849

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

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